Joint Advanced Acquisition Concepts Study (JAACS)

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TTCP Study

- **The Technical Cooperation Program (TTCP) is a long-standing cooperative S&T program among five nations: Australia, Canada, New Zealand, United Kingdom, United States**

- **In June 2001, TTCP's Joint Systems Analysis Group tasked its *Systems Engineering for Defense Modernization* panel (TP4) to conduct a Joint Advanced Acquisition Concepts Study (JAACS) as one of a larger set of activities:**

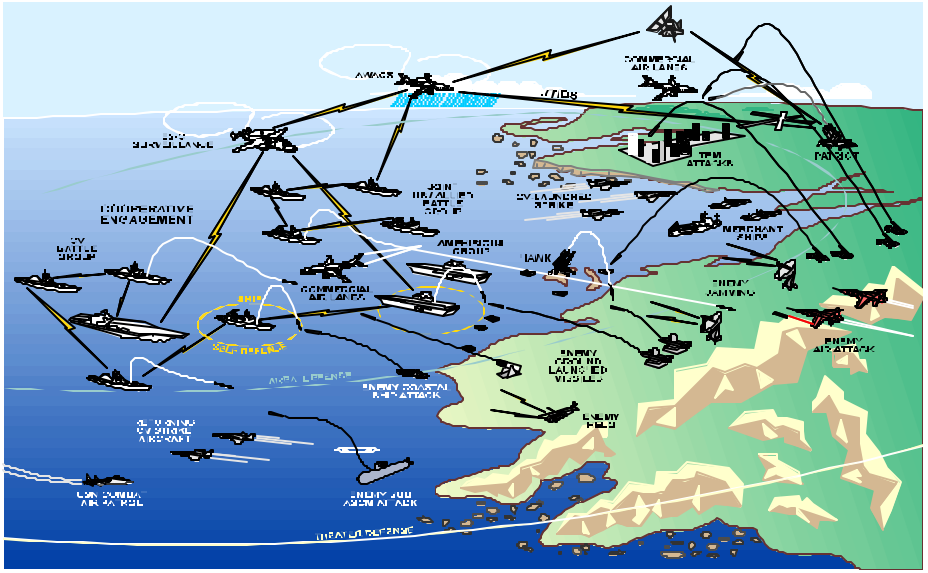
  "This study will assess the feasibility of implementing advanced acquisition concepts proposed by acquisition enhancement initiatives such as System of Systems methodologies, Simulation Based Acquisition, Integrated Digital Environments, Life Cycle Planning, and Evolutionary Acquisition"

Outline

- Study background
- Approach
- Anticipated benefits
- Process

Why Acquisition Must Change

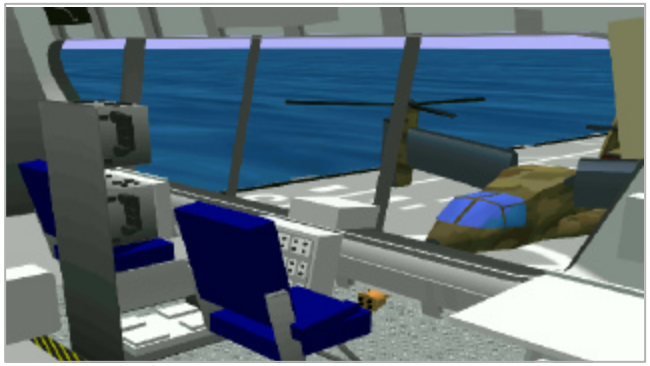
- Greater system complexity
- Interoperability demands
- Need to manage from a mission capability/system of systems perspective

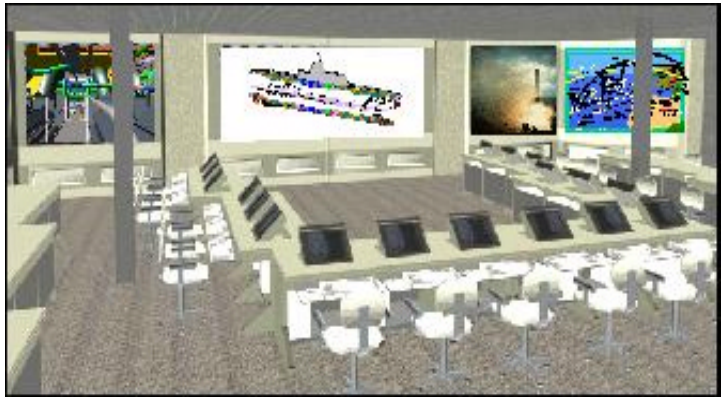


- Adverse trends in risk, time to field and cost due to above complexities
- Declining budgets, reductions in acquisition workforce, reduced government role in technology development
- Improved commercial product and process options

Candidate Solutions

- The *Systems Engineering for Defence Modernisation* panel was asked to examine acquisition enhancement initiatives being advocated to deal with this challenge
  - **System of System methodologies**
  - **Simulation Based Acquisition (SBA)**
  - **Integrated Digital Environments (IDE)**
  - **Life Cycle Planning, Evolutionary Acquisition**





- **Obsolescence Management, Technology Insertion**
- **Whole Life Cost and Requirements Management**
- **Safety-Critical, Software-Intensive Systems Management**

Lifting the Hood

- TP4 examined these acquisition enhancement strategies
  - September 2000: Focus on SoS, SBA and IDE
  - April 2001: Initial consideration of the others

Acquisition enhancement initiatives

Shared concepts

- TP4 found a high degree of commonality in their underlying concepts, and hence a potential for synergy

Advanced Acquisition Concepts

(repeatedly found within the cited initiatives; a consensus vision)

- **Enterprise-wide electronic interactions and information sharing (info created once, used broadly)**
- **Early and continuing collaborative exploration of the largest possible trade space across the life cycle, including time-phased requirements and technology insertion**
- **Conceiving, designing, testing and managing to optimize "system of systems" attributes, including interoperability**
- **M&S-based assessments early in the development cycle; alternative system designs built, tested and operated in the computer before critical decisions are locked-in and manufacturing begins**
- **Reduction of activities more cost-effectively performed in M&S, such as drawings, mock-ups, prototypes and some aspects of live testing**
- **Flexible, iterative mixing of simulations and hardware**
- **Maximum appropriate reuse of all resources - information, software (including COTS), expertise, facilities, etc. – across phases, programs and organizations**

JAACS Relevance
(from JAACS Terms of Reference)

This study will support a key capability manager (CM) and program/project manager (PM) systems engineering task: Determining the acquisition environment (itself a system) in which to define, build and test their defence system. CMs and PMs must be aware of the requirements, feasibility, cost and risk of trying to implement various aspects of the acquisition enhancement concepts. This study provides a structure and discipline for international exploration of acquisition enhancement opportunities.

Enablers: The Necessary Building Blocks

- **Implementing these concepts requires certain enablers**
  - **Required enablers can be derived from the concepts**

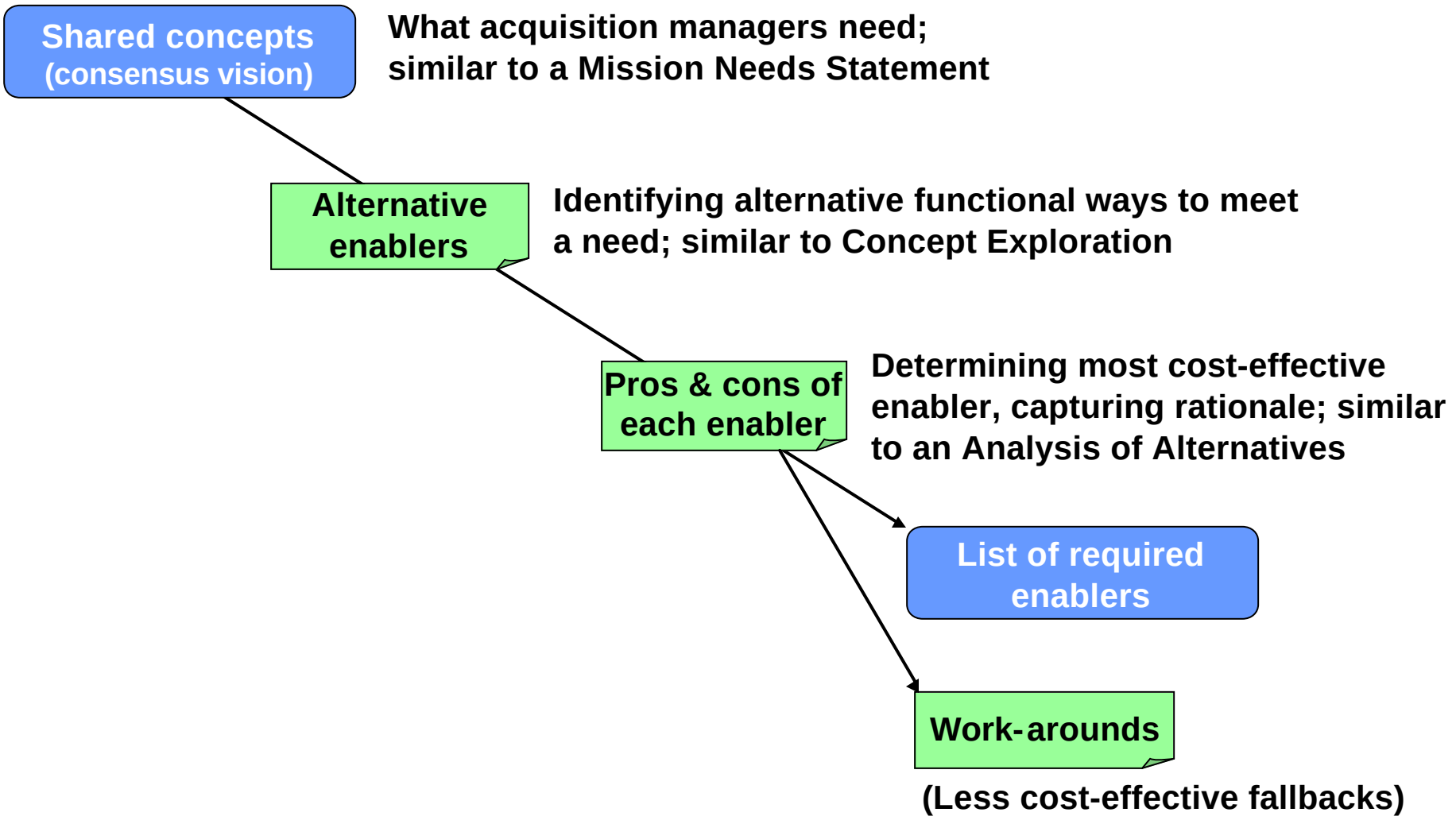
- **The enablers have been tentatively grouped in ten classes**
  - **Policy, law and organizational changes** (Concepts A C D F G)
  - **Process changes** (A B C D E F G)
  - **Standards for data interchange** (A B C D E G)
  - **Standards for software application interoperability** (B C D E G)
  - **Authoritative information sources** (A B C D F G)
  - **Capable, reusable models and simulations** (B C D E F G)
  - **Means to manage collaboration & multi-domain optimization** (B C D)
  - **Means to identify, protect & obtain reusable resources** (A B C D E F G)
  - **Business case evidence** (A B C D E F G)
  - **Education, motivation & evolution of work force** (A B C D E F G)

Note: Well-understood and broadly available enablers (e.g., computers, networks, communication protocols) are omitted

Identifying the Full Enabler Set

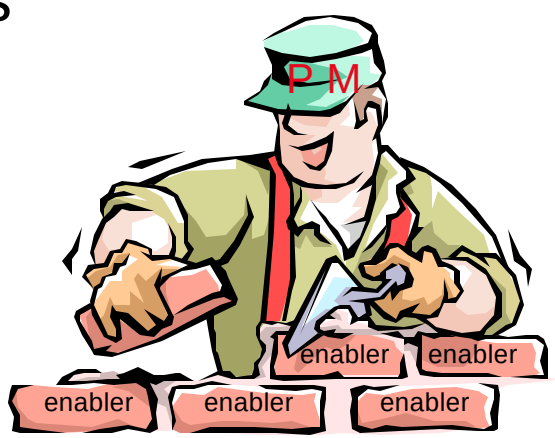
- The U.S. has drafted a notional list of required enablers by synthesizing insights from various sources
  - M&S in acquisition studies, draft SBA Road Map, DoD and NATO M&S Master Plans, professional papers
  - Acquisition program plans and experiences
  - JDEP, NCEE, other projects
  - Inputs from NIST, DMSO, Lockheed Martin Information Systems, NSWC Carderock, others
- This list will be evolved/strengthened through a systems engineering requirements analysis

Requirements Analysis – Derivation of Required Enablers



Equipping PMs

- Deciding whether and how to implement advanced acquisition concepts (AACs) is a difficult task for acquisition managers
  - Must consider needs of task and team, tailor accordingly
  - Must assess cost, schedule and risk
  - Staff expertise is usually limited; unsure what's feasible or can be leveraged from others
  - Most lack the time and money to build it all
- Nations want to spur program use of AACs and can't afford unnecessary duplication among projects
- Therefore, making needed enablers widely available is essential to implement AACs quickly and cost-effectively



Gap Analysis

- Identifying enabler requirements is complimented by a gap analysis to determine if they are:
  - **Realized (in hand)**
  - **Emerging (in work)**
  - **Not yet addressed (gaps)**

- This assessment should consider the many related activities/organizations that may be producing enablers:
  - Each nation's defense organizations
  - Elsewhere in government (e.g., NIST, NASA)
  - Defence industry (e.g., EXOSTAR, individual company initiatives)
  - Commercial industry (e.g., COVISINT, individual company initiatives)
  - Academia (e.g., MIT Center for Innovation in Product Development)
  - Standards organizations (e.g., W3C, ISO, IEEE, OMG, SISO, OASIS)

Incremental Approach, Linked to Critical Coalition Needs

TP4
SE case
studies

#1 Coalition Integrated Air Picture

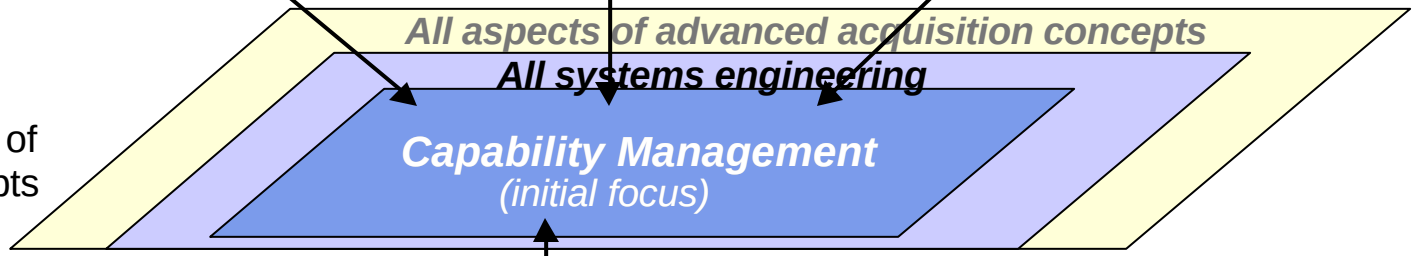
#2 Future Offensive Capability

#3 Inter-group project (tbd)

Practical implementations

JAACS

Capturing practical enablers of advanced acquisition concepts



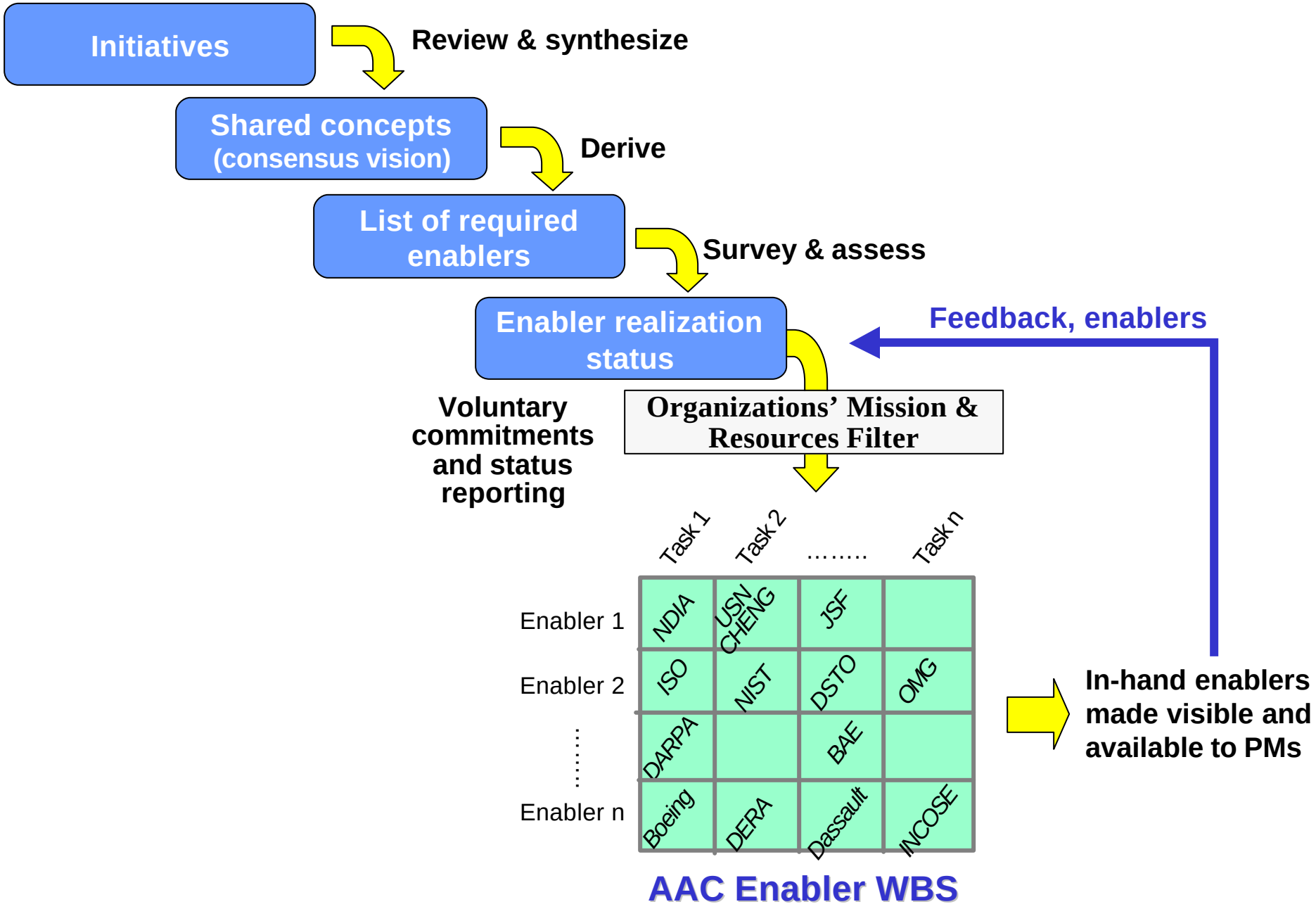
Enabler requirements, candidate enablers

Acquisition/product development enhancement activities
in government, industry, academia and standards organizations

Collaboration to Realize Missing Enablers

- Many organizations are working in this domain; most are unaware of what others are doing
- A common understanding of the enablers required to implement advanced acquisition concepts provides a framework for information sharing and collaboration
- An enabler gap analysis provides a progress assessment and allows smarter resource allocation by the various players
- Communication and cooperation can result in a collaborative plan of work
  - A work breakdown structure (WBS) with progress and executing organizations identified

A Framework for Collaboration



JAACS Study Team – Current National Leads

- Australian representative: Mr. Rene Vandentol
  - Electronic Systems Acquisition Div., Defence Material Organisation
- Canadian representative: Mr. Dave Madeley
  - DMASP 5-2 Systems Engineering, National Defence Headquarters
- NZ representative: TBD
- UK representative: Lt Cdr Monty Long, RN
  - Synthetic Environments Coordination Office (SECO), MoD
- US representative: CAPT Jim Hollenbach, USN (Ret.), chairman
  - Consultant to the Navy Acquisition Reform Executive, OASN(RDA)
- Academic advisor to JAACS: Dr. Stephen Cook
  - DSTO Professor of Systems Engineering, Univ. of South Australia

JAACS Schedule
(from JAACS Terms of Reference)

1st year (June 2001- June 2002): Liaise with acquisition enhancement project leaders and interested organizations; refine key concepts definition; develop initial list of required enablers; begin initial assessment of enabler realization.

2nd year: Develop a baseline list of required enablers; liaise with enabler developers and users; present study to professional societies and invite their review; prepare a joint professional paper on trends in acquisition enhancement.

3rd year: Update definition of required enablers in light of project insights; refine assessment of enabler realization.

4th and 5th years: Update the above in light of continued progress in concept implementation.

Complimentary Activities

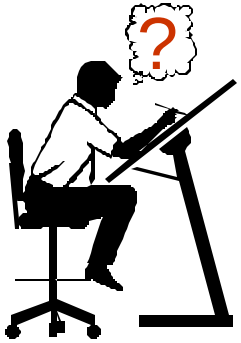
- Similar Navy and DoD Acquisition Council efforts
  - Acqn Council will serve as a national coordination point
- May ’01 NDIA SE conference, *Enabling the 21st Century Acquisition Enterprise*, organized around 10 enabler classes
- SISO establishment of a Systems Acquisition and Product Development (SAPD) forum at its semi-annual workshops
- INCOSE work group being formed

Anticipated Benefits

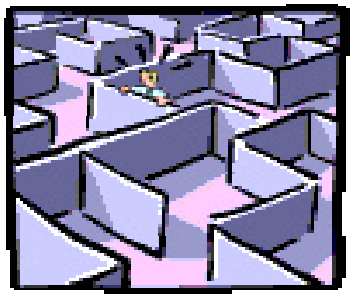
Project tasks

Defining program's ideal acquisition environment

Determining requirements to establish it



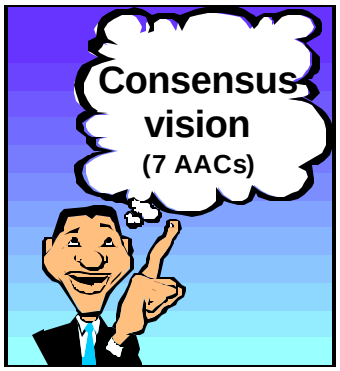
Assessing feasibility, cost and risk



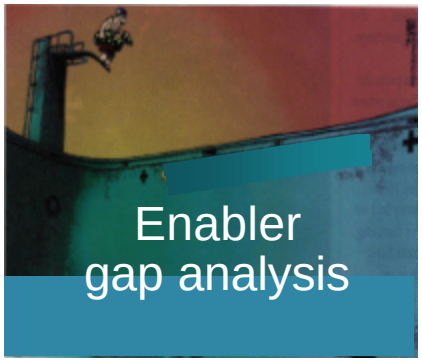
Establishing engineering environment

Solutions - delivered via web technology, education, assist visits

JAACS Deliverables



List of required enablers



Summary

- Team formed, study underway
- Complimentary to other acquisition improvement efforts
- Challenging issues
- JAACS will clarify, facilitate SBA/advanced acquisition concepts from an international perspective
- Important for coalition force interoperability and international acquisition programs